

## Relevant Training for the Healthcare Workforce: The Perspective of Clinical Informatics

William Hersh, MD

Professor and Chair

Department of Medical Informatics & Clinical Epidemiology

Oregon Health & Science University

Portland, OR, USA

Email: [hersh@ohsu.edu](mailto:hersh@ohsu.edu)

Web: [www.billhersh.info](http://www.billhersh.info)

Blog: [informaticsprofessor.blogspot.com](http://informaticsprofessor.blogspot.com)

### References

- Anonymous (1998). Medical School Objectives Project: Medical Informatics Objectives. Washington, DC, Association of American Medical Colleges.  
[https://services.aamc.org/publications/showfile.cfm?file=version87.pdf&prd\\_id=198&prv\\_id=239&pdf\\_id=87](https://services.aamc.org/publications/showfile.cfm?file=version87.pdf&prd_id=198&prv_id=239&pdf_id=87).
- Anonymous (2007). Evidence and Informatics Transforming Nursing: 3-Year Action Steps toward a 10-Year Vision. Denver, CO, Technology Informatics Guiding Education Reform (TIGER) Initiative. [https://www.tigersummit.com/uploads/TIGERInitiative\\_Report2007\\_bw.pdf](https://www.tigersummit.com/uploads/TIGERInitiative_Report2007_bw.pdf).
- Anonymous (2008). Joint Workforce Task Force: Health Information Management and Informatics Core Competencies for Individuals Working with Electronic Health Records. Chicago, IL and Bethesda, MD, American Health Information Management Association and American Medical Informatics Association. [https://www.amia.org/files/shared/Workforce\\_2008.pdf](https://www.amia.org/files/shared/Workforce_2008.pdf).
- Anonymous (2009a). Medical Records and Health Information Technicians. Occupational Outlook Handbook, 2010-11 Edition. Washington, DC, Bureau of Labor Statistics.  
<http://www.bls.gov/oco/ocoS103.htm>.
- Anonymous (2009b). Public Health Informatics Competencies. Atlanta, GA, Centers for Disease Control and Prevention.  
[http://www.cdc.gov/InformaticsCompetencies/downloads/PHI\\_Competencies.pdf](http://www.cdc.gov/InformaticsCompetencies/downloads/PHI_Competencies.pdf).
- Blumenthal, D. (2010). Launching HITECH. *New England Journal of Medicine*, 362: 382-385.
- Blumenthal, D. and Tavenner, M. (2010). The “meaningful use” regulation for electronic health records. *New England Journal of Medicine*, 363: 501-504.
- Chaudhry, B., Wang, J., et al. (2006). Systematic review: impact of health information technology on quality, efficiency, and costs of medical care. *Annals of Internal Medicine*, 144: 742-752.
- DelBeccaro, M., Jeffries, H., et al. (2006). Computerized provider order entry implementation: no association with increased mortality rates in an intensive care unit. *Pediatrics*, 118: 290-295.
- Detmer, D., Munger, B., et al. (2010). Medical informatics board certification: history, current status, and predicted impact on the medical informatics workforce. *Applied Clinical Informatics*, 1: 11-18.
- Dolan, P. (2010). Physician smartphone popularity shifts health IT focus to mobile use. American Medical News. August 23, 2010. <http://www.ama-assn.org/amednews/2010/08/23/bil10823.htm>.
- Einbinder, L., Lorenzi, N., et al., eds. (2010). *Transforming Health Care Through Information: Case Studies*. New York, NY. Springer.
- Garg, A., Adhikari, N., et al. (2005). Effects of computerized clinical decision support systems on practitioner performance and patient outcomes: a systematic review. *Journal of the American Medical Association*, 293: 1223-1238.

- Goldzweig, C., Towfigh, A., et al. (2009). Costs and benefits of health information technology: new trends from the literature. *Health Affairs*, 28: w282-w293.
- Greiner, A. and Knebel, E., eds. (2003). *Health Professions Education: A Bridge to Quality*. Washington, DC. National Academies Press. <http://www.nap.edu/books/0309087236/html/>.
- Han, Y., Carcillo, J., et al. (2005). Unexpected increased mortality after implementation of a commercially sold computerized physician order entry system. *Pediatrics*, 116: 1506-1512.
- Hersh, W. (2009). A stimulus to define informatics and health information technology. *BMC Medical Informatics & Decision Making*, 9: 24. <http://www.biomedcentral.com/1472-6947/9/24/>.
- Hersh, W. (2010). The health information technology workforce: estimations of demands and a framework for requirements. *Applied Clinical Informatics*, 1: 197-212.
- Hersh, W. and Wright, A. (2008). What workforce is needed to implement the health information technology agenda? An analysis from the HIMSS Analytics™ Database. *AMIA Annual Symposium Proceedings*, Washington, DC. American Medical Informatics Association. 303-307.
- Hsiao, C., Beatty, P., et al. (2010). Electronic Medical Record/Electronic Health Record Systems of Office-based Physicians: United States, 2009 and Preliminary 2010 State Estimates. Hyattsville, MD, National Center for Health Statistics. [http://www.cdc.gov/nchs/data/hestat/emr\\_ehr\\_09/emr\\_ehr\\_09.htm](http://www.cdc.gov/nchs/data/hestat/emr_ehr_09/emr_ehr_09.htm).
- Jacobs, B., Brill, R., et al. (2006). Perceived increase in mortality after process and policy changes implemented with computerized physician order entry. *Pediatrics*, 117: 1451-1452.
- Jha, A., DesRoches, C., et al. (2010). A progress report on electronic health records in U.S. hospitals. *Health Affairs*, 29: 1951-1957.
- Leviss, J., Gugerty, B., et al. (2010). *H.I.T. or Miss: Lessons Learned from Health Information Technology Implementations*. Chicago, IL. American Health Information Management Association.
- Leviss, J., Kremsdorf, R., et al. (2006). The CMIO - a new leader for health systems. *Journal of the American Medical Informatics Association*, 13: 573-578.
- Phibbs, C., Milstein, A., et al. (2005). No proven link between CPOE and mortality. *Pediatrics*. <http://pediatrics.aappublications.org/cgi/eletters/116/6/1506>.
- Shaffer, V. and Lovelock, J. (2010). Results of the Gartner-AMDIS Survey of Chief Medical Informatics Officers. Stamford, CT, Gartner.
- Shortliffe, E. (2010). Biomedical informatics in the education of physicians. *Journal of the American Medical Association*, 304: 1227-1228.
- Sittig, D., Ash, J., et al. (2006). Lessons from "unexpected increased mortality after implementation of a commercially sold computerized physician order entry system". *Pediatrics*, 118: 797-801.
- Stead, W., Searle, J., et al. (2010). Biomedical informatics: changing what physicians need to know and how they learn. *Academic Medicine*: Epub ahead of print.

# Relevant Training for the Healthcare Workforce: The Perspective of Clinical Informatics

William Hersh, MD  
Professor and Chair  
Department of Medical Informatics & Clinical Epidemiology  
Oregon Health & Science University  
Portland, OR, USA  
Email: [hersh@ohsu.edu](mailto:hersh@ohsu.edu)  
Web: [www.billhersh.info](http://www.billhersh.info)  
Blog: [informaticsprofessor.blogspot.com](http://informaticsprofessor.blogspot.com)



1

## Informatics is critical to healthcare reform

- A critical aspect of healthcare reform is improved use of information for quality, safety, and integration of care
  - This is even more imperative with ARRA/HITECH and ACA legislation
- Biomedical and health informatics is the discipline of improving healthcare, biomedical research, and public health through better use of information (Hersh, 2009)
  - It's about information, not technology
- Competency in informatics varies by group
  - Clinicians (Stead, 2010; Shortliffe, 2010)
  - Informaticians (Hersh, 2010)
- Physicians are not luddites: 72% smartphone usage (Dolan, 2010)



2

## We have entered a new “ARRA” of health IT and informatics



*“To lower health care cost, cut medical errors, and improve care, we’ll computerize the nation’s health records in five years, saving billions of dollars in health care costs and countless lives.”*

First Weekly Address  
Saturday, January 24, 2009



3

## Implications of the new “ARRA” for health IT and informatics

- Health Information Technology for Economic and Clinical Health (HITECH) Act of the American Recovery and Reinvestment Act (ARRA) (Blumenthal, 2010)
  - Incentives for “meaningful use” of electronic health records (EHRs) by physicians and hospitals (up to \$27B)
    - We have a long ways to go: ~10% complete adoption by physicians (Hsaio, 2010) and hospitals (Jha, 2010)
  - Direct grants administered by federal agencies, including workforce development (\$2B)
- Patient Protection and Affordable Care Act (ACA) initiatives require IT and informatics, e.g., accountable care organizations (ACOs), value-based purchasing, etc.



4

## What do we know about the informatics workforce?

- Systematic reviews show benefit for HIT interventions but most studies done in small number of academic centers (Garg, 2005; Chaudhry, 2006; Goldzweig, 2009)
- Problematic health IT implementations well-known, with failure often attributable to lack of understanding of clinical environment and workflow (Leviss, 2010; Einbinder, 2010)
- Case study: implementation of computerized physician order entry (CPOE) showed adverse consequences
  - Mortality rate increased from 2.8% to 6.6% at Children’s Hospital of Pittsburgh Pediatric ICU (Han, 2005)
  - Increased mortality not seen at other academic centers (Del Baccaro, 2006; Jacobs, 2006)
  - Pittsburgh adverse outcome may have been avoided with adherence to known “best practices” (Phibbs, 2005; Sittig, 2006)

5



## Who is the HIT workforce?

- Three historical groups of HIT professionals
  - Information technology (IT) – usually with computer science or information systems background
  - Health information management (HIM) – historical focus on medical records
  - Clinical informatics (CI) – often from healthcare backgrounds
- A challenge: with exception of HIM, no standard occupational classification (SOC)

6



## How many IT personnel do we have and do we need?

- IT – to reach level of known benefit and meaningful use, may need 40,000 (Hersh, 2008)
- HIM – from US Bureau of Labor Statistics occupational employment projections 2008-2018 (BLS, 2009)
  - Medical Records and Health Information Technicians (RHITs and coders) – projected 20% growth in next 10 years
- CI – growing number of individuals who combine clinical knowledge and informatics skills
  - Analysts, trainers, support staff, etc.
  - Recognition of growing role of CMIO and other CI leaders (Leviss, 2006; Shaffer, 2010), leading to proposal for medical subspecialty (Detmer, 2010)

7



## What competencies must informaticians have? (Hersh, 2009)

### Health and biological sciences:

- Medicine, nursing, etc.
- Public health
- Biology

**Competencies required in  
Biomedical and Health  
Informatics**

### Management and social sciences:

- Business administration
- Human resources
- Organizational behavior

### Computational and mathematical sciences:

- Computer science
- Information technology
- Statistics

8



## HITECH estimates need for 50,000 in Workforce Development Program

- Community College Consortia to Educate Health Information Technology Professionals Program (\$70M)
  - Five regional consortia of 70 community colleges offering short-term training for 10,000 individuals per year
- Curriculum Development Centers Program (\$10M)
  - Five universities collaboratively developing (with community college partners) HIT curricula for 20 components (courses)
  - One of the five centers (OHSU) additionally funded as National Training and Dissemination Center
- Competency Examination for Community College Programs (\$6M)
  - Developing competency examinations based on the six community college job roles
- Program of Assistance for University-Based Training (\$32M)
  - Funding for education of individuals requiring university-level training at nine universities (including OHSU)
  - Emphasis on short-term certificate programs delivered via distance learning

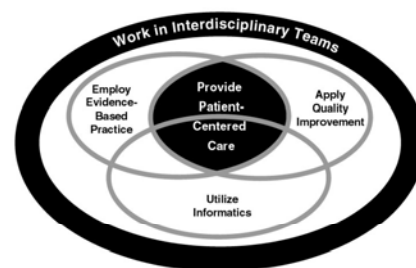
9



## Informatics is also a core competency for health professionals

- Highlighted in IOM report on education (Greiner, 2003)
- Competency with primary and secondary uses of information
  - “From individual brains to systems of brains” (Stead, 2010)
  - Students spend time with patients AND information (Shortliffe, 2010)
- Some noteworthy initiatives (Hersh, 2010)
  - AAMC MSOP (1998) – details old but framework still valid
  - AMIA-AHIMA Core Competencies for Individuals Working with Electronic Health Records (2008)
  - Also nursing (TIGER, 2007), public health (CDC, 2009), and others

Overlap of Core Competencies for Health Professionals



1.1

10



## Competencies and workforce development for clinicians

- Growing recognition that healthcare professionals need
  - Basic computer literacy
  - Competency with primary and secondary uses of information (Stead, 2010; Shortliffe, 2010)
    - e.g., quality measurement and improvement, evidence-seeking, collaboration, etc.
- Some noteworthy initiatives (Hersh, 2010)
  - AAMC MSOP (1998) – details old but framework still valid
  - AMIA-AHIMA Core Competencies for Individuals Working with Electronic Health Records (2008)
  - Also nursing (TIGER, 2007), public health (CDC, 2009), and others

11



## For more information

- Bill Hersh
  - <http://www.billhersh.info>
- Informatics Professor blog
  - <http://informaticsprofessor.blogspot.com>
- OHSU Department of Medical Informatics & Clinical Epidemiology (DMICE)
  - <http://www.ohsu.edu/dmice>
  - <http://oninformatics.com>
- OHSU financial assistance for informatics training
  - <http://www.informatics-scholarship.info>
- What is BMHI?
  - <http://www.billhersh.info/whatis>
- Office of the National Coordinator for Health IT (ONC)
  - <http://healthit.hhs.gov>
- American Medical Informatics Association (AMIA)
  - <http://www.amia.org>

12

